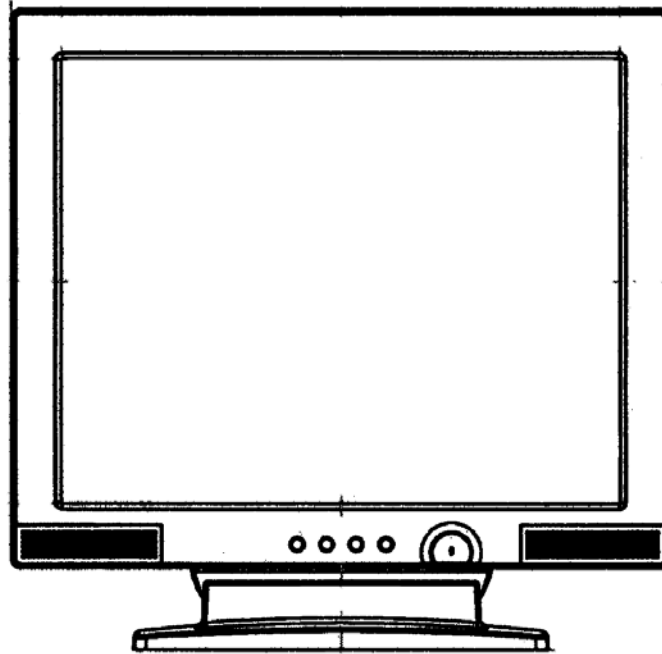


Service Manual



Model : Belinea 101710

MAXDATA Systeme GmbH

Elbestr. 16

45768 Marl / Germany

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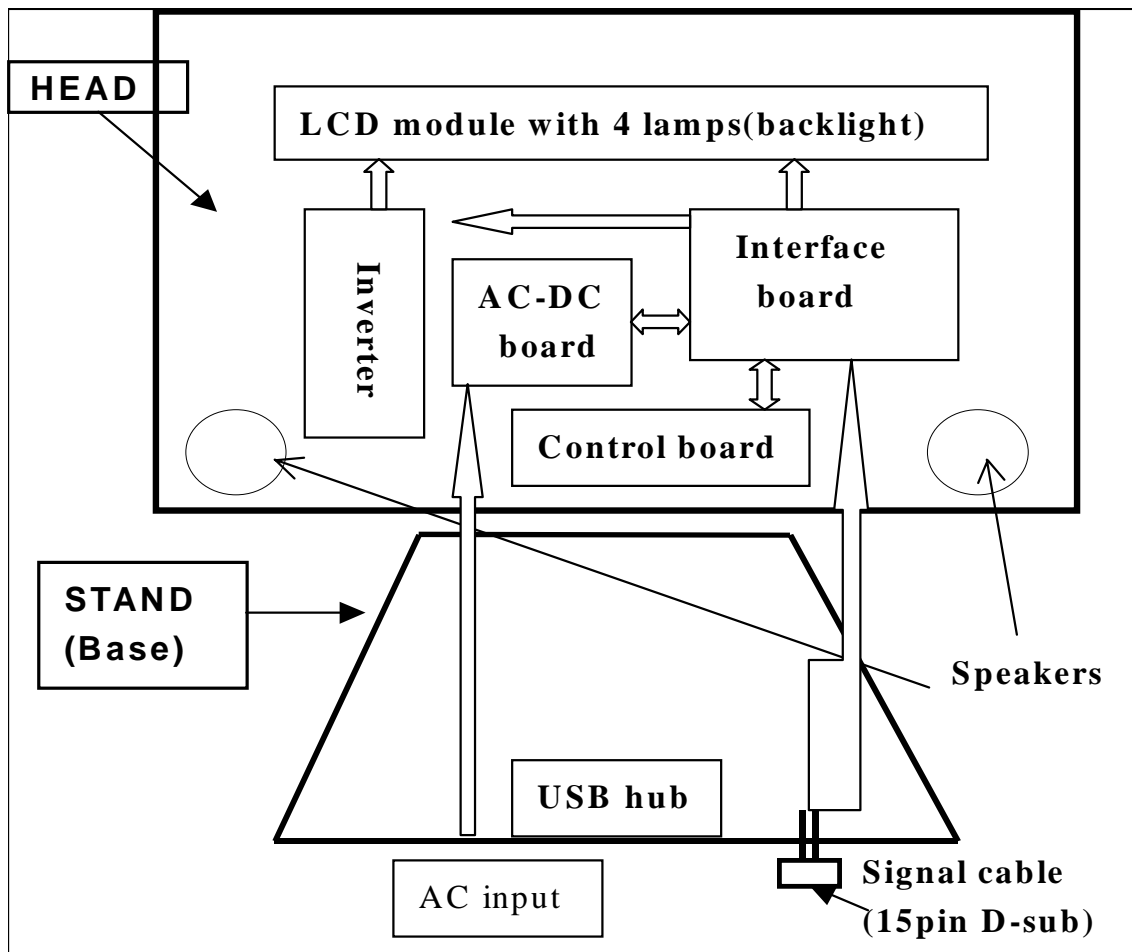
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1.1 Introduction

The Belinea 101710 is an 17" SXGA(1280x1024) 24 bits color TFT LCD monitor with multi-media function and an optional USB hub. It's an analog interface LCD monitor with an undetachable 15 pins D-sub signal cable and it's compliant with VESA specification to offer a smart power management and power saving function. It also offers OSD menu for users to control the adjustable items and get some information about this monitor, and the best function is to offer users an easy method to set all adjustable items well just by pressing one key, we called it "i-key"(intelligent key) which can auto adjusting all controlled items.

1.2 Block diagram

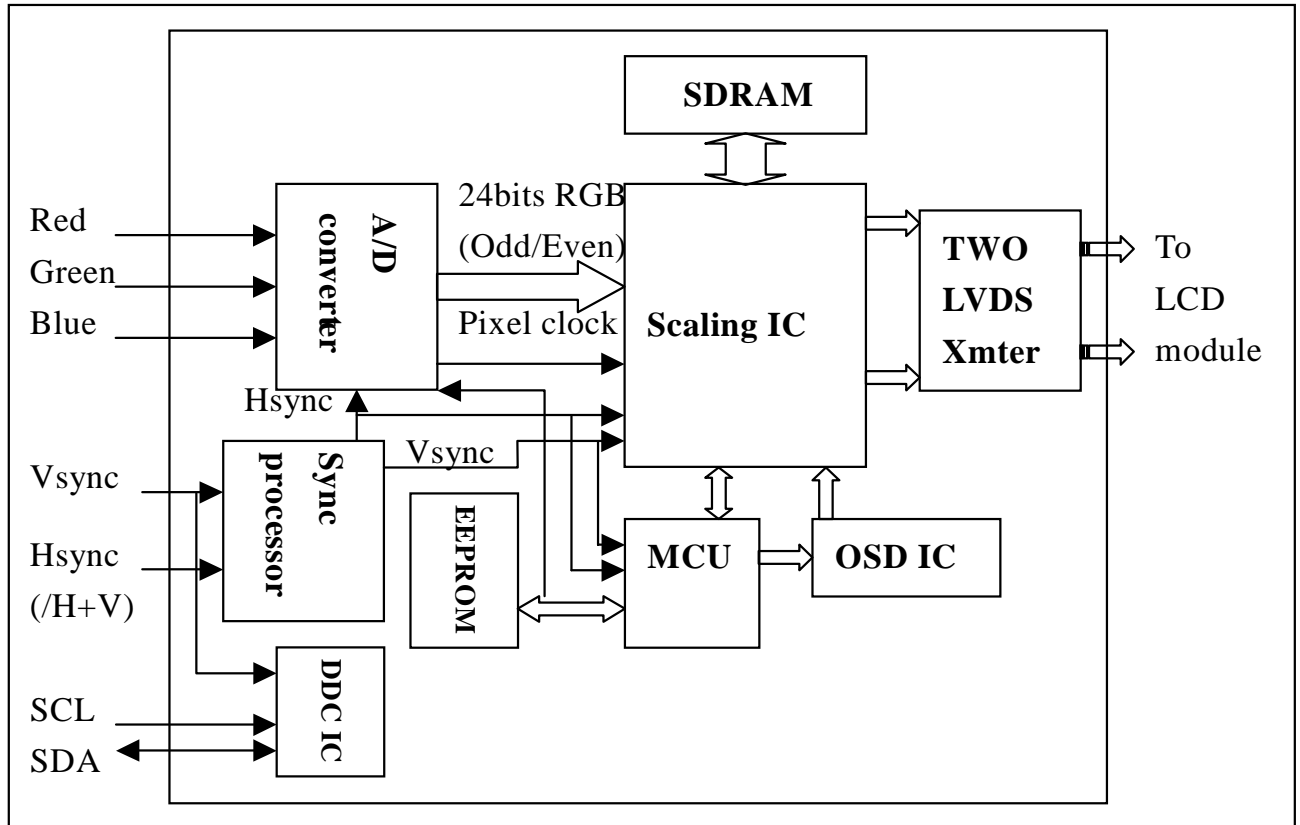
The Belinea 101710 consists of a head and a stand (base). The head consists of a LCD module with 4 lamps, an Inverter, an Interface board, a AC-DC board, a Control board and a microphone. The stand consists of an AC-DC board, an Audio board, two speakers and an optional USB hub. The block diagram is shown as below,



1.3 Circuit operation theory

1.3.1 Interface board diagram

Interface Board



1.3.1.1 Circuit operation theory

A basic operation theory for this interface board is to convert analog signals of Red, Green and Blue to digital signals of Red, Green and Blue, and by the internal PLL circuit of A/D converter to generate the pixel clock to output to the scaling IC, then the scaling IC use the SDRAM to be the frame buffer to process the different input signals which are operating in the specification of the A/D converter and the scaling IC, finally the scaling IC output the digital RGB data, the fixed frequency of Hsync, Vsync and pixel clock to LCD panel driver IC by LVDS transmitter.

1.3.1.2 IC introduction

- 1.) DDC(Display Data Channel) IC: We use ATMEL 24C21 to support DDC1/2B function, it will store the information related to LCD monitor and PC can read them by "Vsync and SDA" serial communication for DDC1 or I² C communication for DDC2B.
- 2.) Sync Processor: Because the A/D converter and the scaling IC of this board can't separate composite Sync into Hsync and Vsync by themselves, we use 14053B to output the pure Hsync and Vsync respectively to them to solve this application problem.
- 3.) A/D converter: We use AD9884 of ADI which can support maximum 140MHz pixel rate to convert analog signals of RGB to 24bits digital RGB signals and generate a pixel clock signal by Hsync and its internal PLL circuit, then transmit these digital signals to Scaling IC.

- 4.) Scaling IC: We use MX88L282 of Macronix and by its frame buffer function to process the digital RGB signals to maximum 75Hz refresh rate at 1280 by 1024 resolution(about 135MHz pixel rate), it also support a ratio expansion function to display a full screen when the resolution of input signals are less than 1280 by 1024.
- 5.) SDRAM: We use 3 pieces of 2M bytes SDRAM to be the frame buffer of the scaling IC to process maximum 1280 by 1024 resolution of 24 bits RGB data.
- 6.) MCU: We use Myson MTV112V to controls all the functions of this interface board, just like the mode detecting, OSD display setting, the adjustable items, adjusted data storage, DPMS control, the external RS232 communication and the scaling IC
- 7.) EEPROM: We use 24C04 to store all the adjustable data , and we divide it into two parts for the storage of factory settings and user settings.
- 8.) OSD IC: We use LSC3852 of Motorola to do "On Screen Display" function.
- 9.) LVDS transmitter IC: We use two pieces of THC63LVDM83A of Thine to transmit all the digital data to the LCD panel driver IC because this driver IC has two pieces of built-in THC63LVDM83A (LVDS receiver IC).

1.3.2 AC-DC board diagram

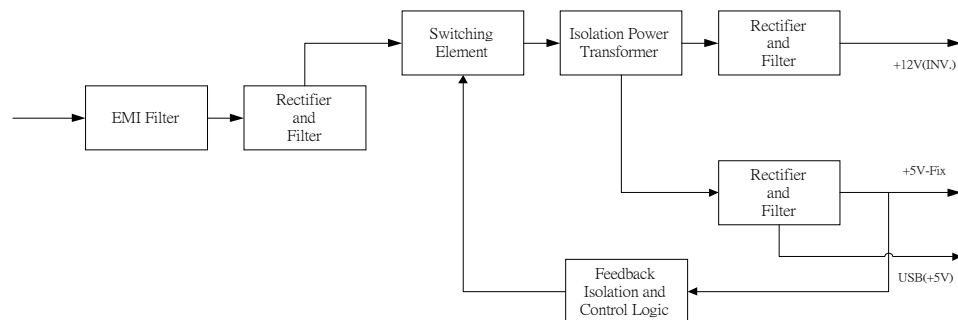


Fig. 1

1.3.2.1 EMI Filter

This circuit (fig. 2) is designed to inhibit electric and magnetic interference for Meet FCC, VDE, VCCI standard requirements

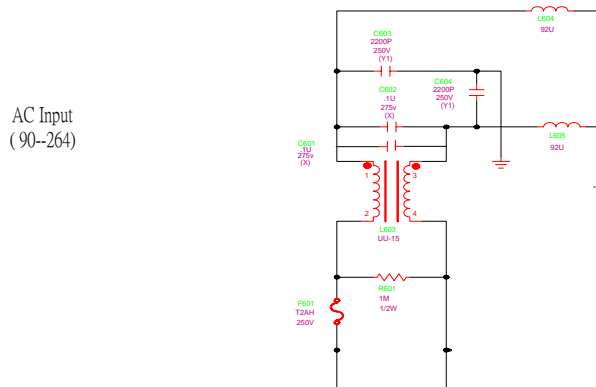
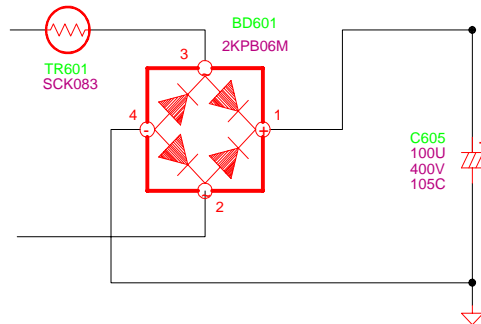


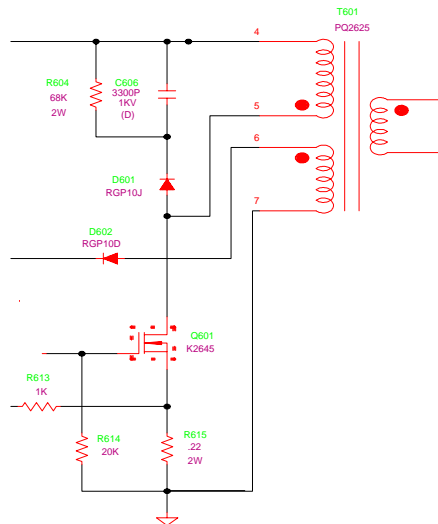
Fig. 2

1.3.2.2 Rectifier and filter

AC Voltage (90-264V) is rectified and filtered by BD601, C605 (See Fig 3) and the DC Output voltage is $1.4 \times (\text{AC input})$. (See Fig.3)

**Fig. 3****1.3.2.3 Switching element and Isolation power transformer**

When the Q601 turns on, energy is stored in the transformer. During Q601 OFF period, the stored energy is delivered to the secondary of transformer. R604, C606 and D601 is a snubber circuit. R605 is current sense resistor to control output power. (See Fig.4)

**Fig. 4**

1.3.2.4 Rectifier and filter

D701 and C701 are to produce DC output. L701 and C702 are to suppress high Frequency switching spikes. R702 is a dummy load. (See Fig.5)

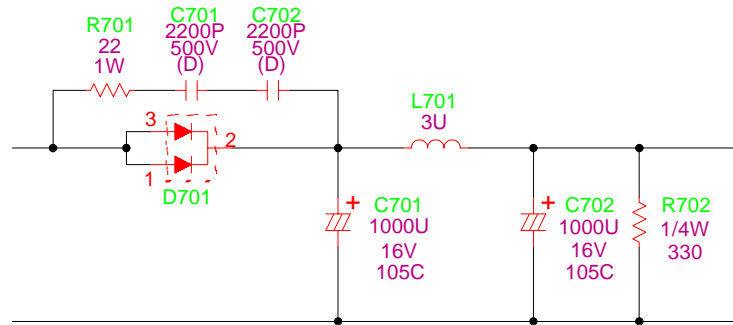


Fig. 5

1.3.2.5 Control circuit

The current mode control IC UC3843A is used to control PWM. When the VCC terminal of it gets 8.4V, IC601 turns on. +5V will be set up at Pin8 through soft start circuit includes R617, C611, D606 and D605. R616 and C610 generate a fixed frequency sawtooth wave at Pin4.

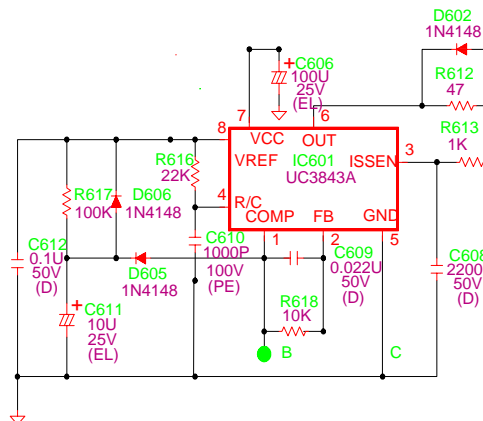


Fig. 6

1.3.2.6 Feedback circuit

TLP721F is a optocoupler and TL431 is a shunt regulation. They are used to detect the output voltage change and primary and secondary isolation. When output voltage changes, the feedback voltage will be compared and duty cycle will be decided to control the correct output voltage. (See Fig.7)

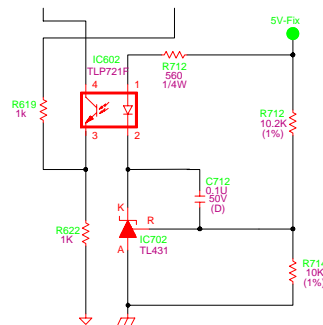
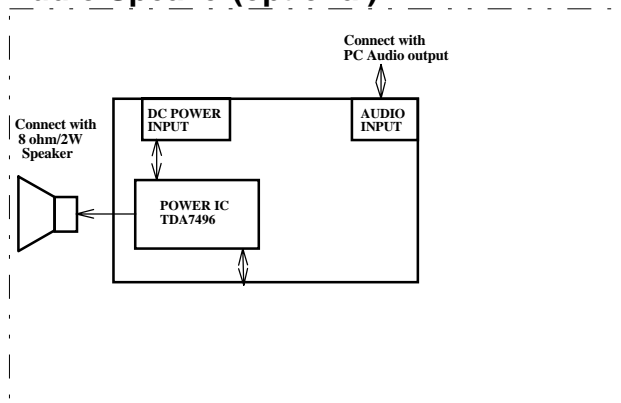


Fig. 7

1.3.3 Audio Speaker(optional)



The Audio Speaker is consist of an Audio board. The Audio Speaker have DC Volumn control, use 28mmX40mm Speaker (2W/per chennal), power supply from AC-DC board and Audio input from PC Audio output (Line Out) .

1.3.3.1 Power IC

Use ST POWER IC TDA7496. The IC are stereo AB Class output amplifiers with DC Volume control. The devices are designed for use in TV and monitor, but are also suitable for battery-Fed portable recorders and radios. Use +12V from AC-DC Board and connect speaker to offer 1W per chennal.

1.3.3.2 DC Power Input

To supply +12V to be VCC source Voltage for TDA7496 and built-in AC-DC board.

1.3.3.3 Audio Input

connect with PC Audio output in 3.5mm to 3.5mm signal line.

1.3.3.4 Speaker

Use 8 ohm and 28mmX40mm speaker (2W/per chennal)

1.3.3.5 DC Volumn Control

The voltage range is 1 – 5 V (From MC)

Alignment procedure (for function adjustment)

1. Enter factory area (press “enter” & “exit” & “power on”).
2. selected timing which has star sign(*) have to adjust. (see figure 1).
3. clear user area.
4. adjust the contrast and the brightness bar to “50”.
5. Press I-key to adjust the image.
6. check the image if phase is not perfect adjust it to the best step.
7. Save factory parameter then turn off power.
8. Clear user area.
9. Turn on power enter user area.

Figure 1.

Incoming display mode(Input timing)					Multi-scan operation
Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)	Dot Clock Frequency (MHz)	Remark	Actual display resolution
*640x350	31.47(P)	70.08(N)	25.17	DOS	full screen 1280x1024
*720x400	31.47(N)	70.08(P)	28.32	DOS	
*640x480	31.47(N)	60.00(N)	25.18	DOS	
*640x480	35.00(N)	67.00(N)	30.24	Macintosh	
*640x480	37.86(N)	72.80(N)	31.5	VESA	
*640x480	37.50(N)	75.00(N)	31.5	VESA	
*800x600	37.88(P)	60.32(P)	40.00	VESA	
*800x600	48.08(P)	72.19(P)	50.00	VESA	
*800x600	46.86(P)	75.00(P)	49.50	VESA	
832X624	49.72(N)	74.55(N)	57.29	Macintosh	
*1024x768	48.36(N)	60.00(N)	65.00	VESA	
1024x768	56.48(N)	70.10(N)	75.00	VESA	
*1024x768	60.02(P)	75.00(P)	78.75	VESA	
1024X768	60.24(N)	74.93(N)	80.00	Macintosh	
1152x864	67.50(P)	75.00(P)	108.00	VESA	
1152x870	68.68(N)	75.06(N)	100.00	Macintosh	
1152x900	61.80(P)	66.00(P)	92.94	SUN 66	
1152x900	71.81(N)	76.14(N)	108.00	SUN	
*1280x1024	64.00(P)	60.00(P)	108.00	VESA	
*1280x1024	75.83(N)	71.53(N)	128.00	IBM1	
*1280x1024	80.00(P)	75.00(P)	135.00	VESA	
1280x1024	81.18(N)	76.16(N)	135.09	SPARC2	

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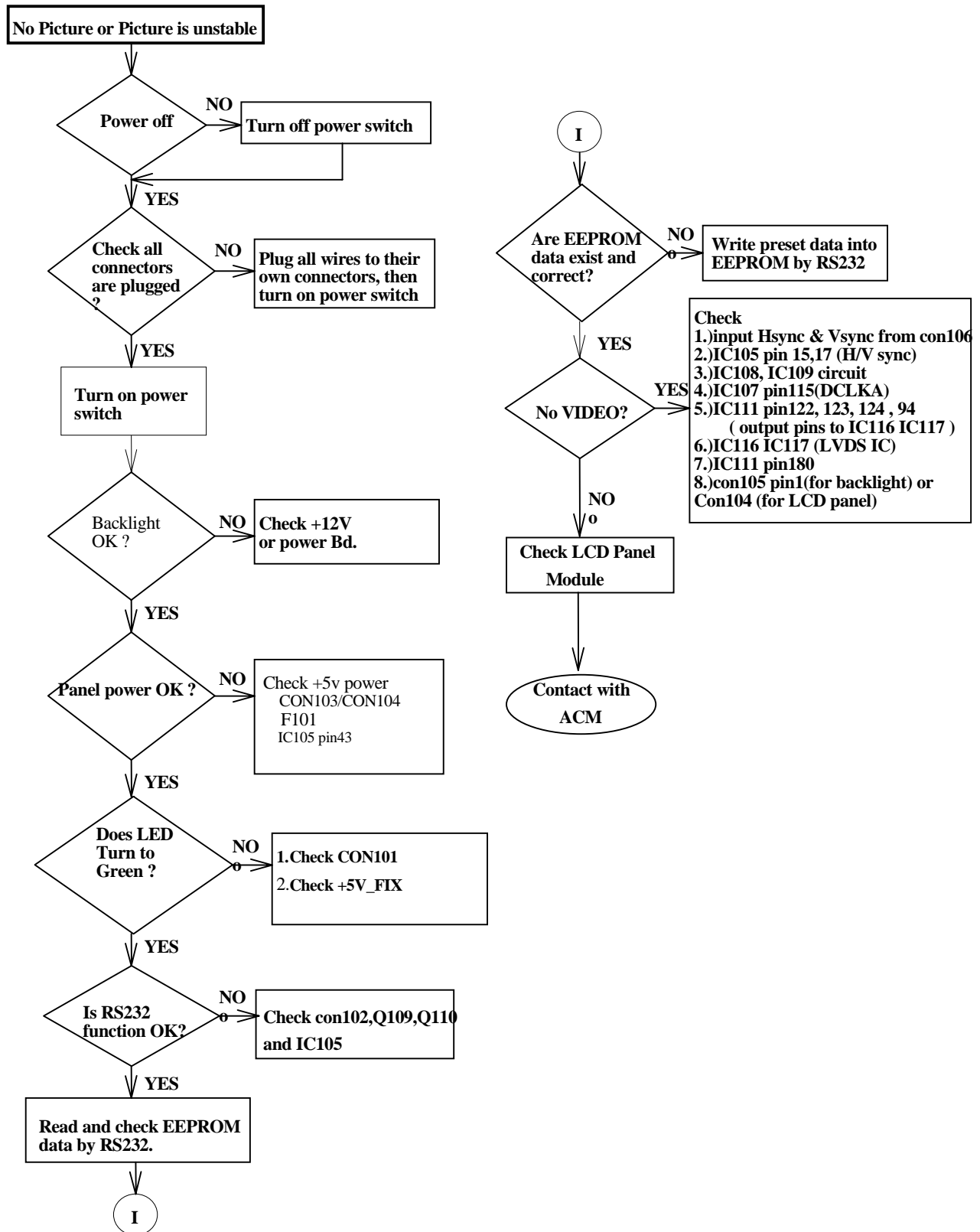
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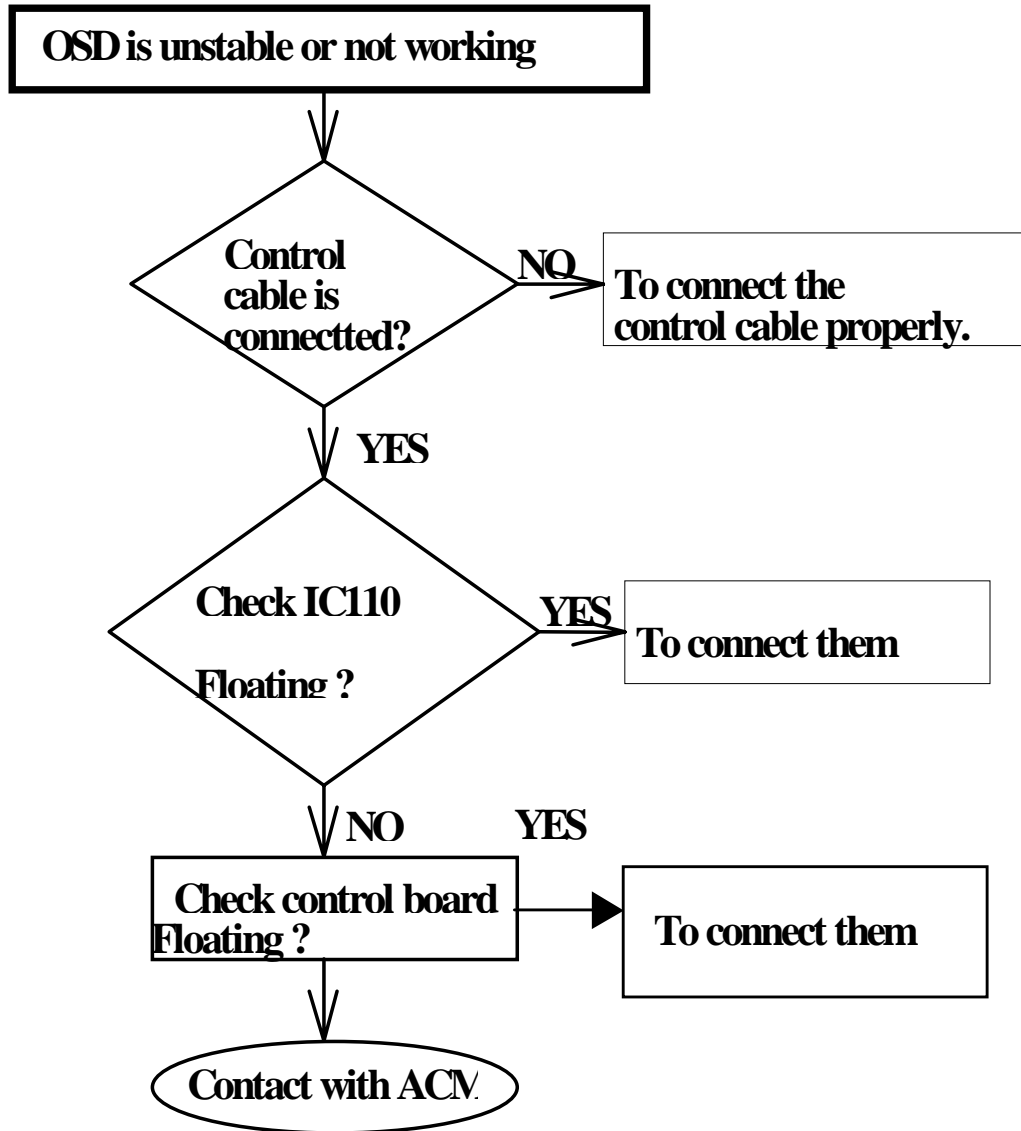
4.5 Power Board with audio6

4.1 No Picture or Picture is unstable



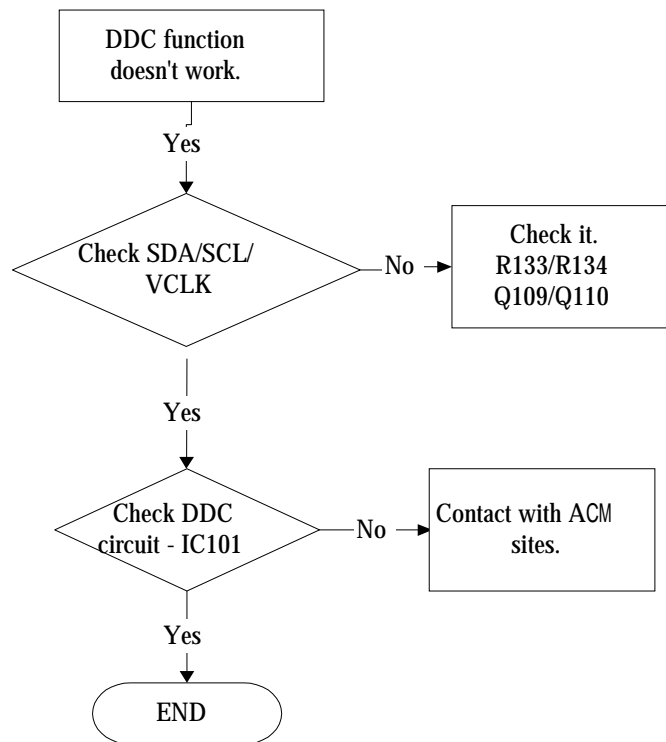
4.2 BUTTON function

4.2.1 Control Board

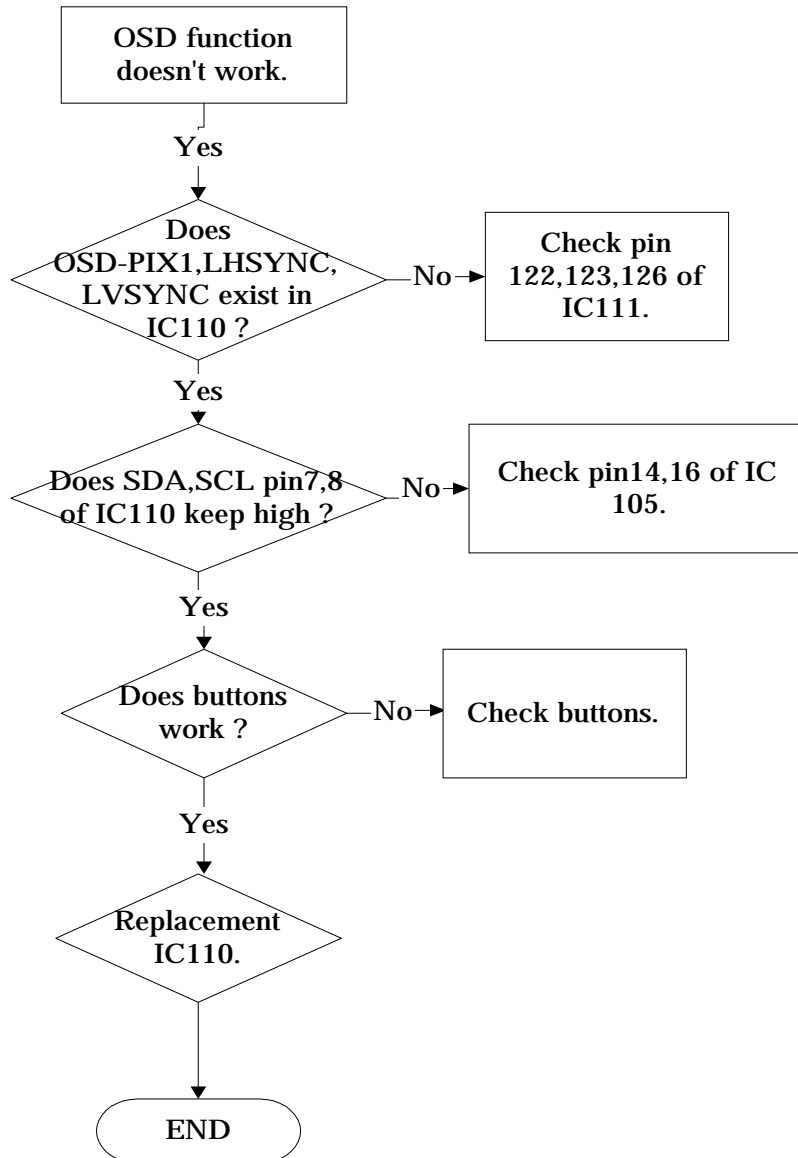


4.3 DDC function

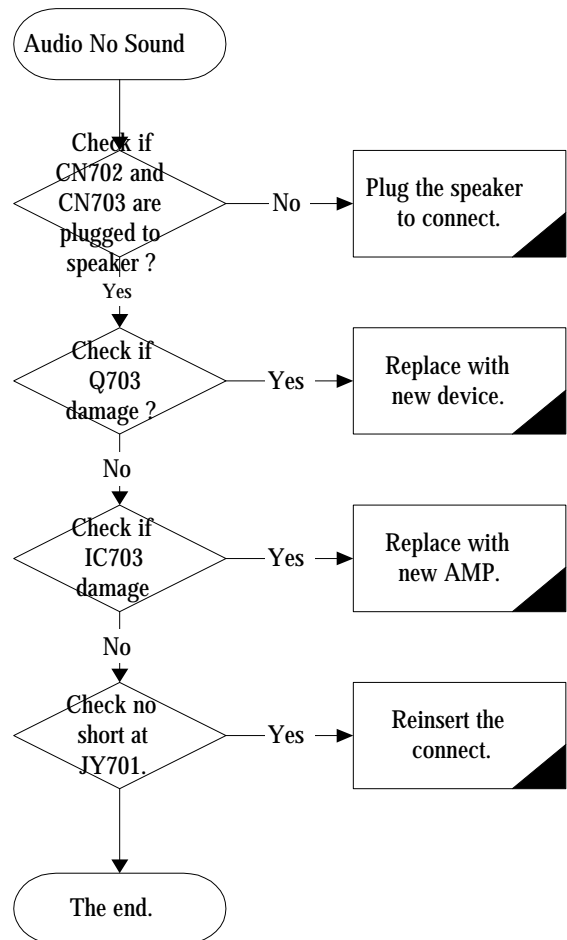
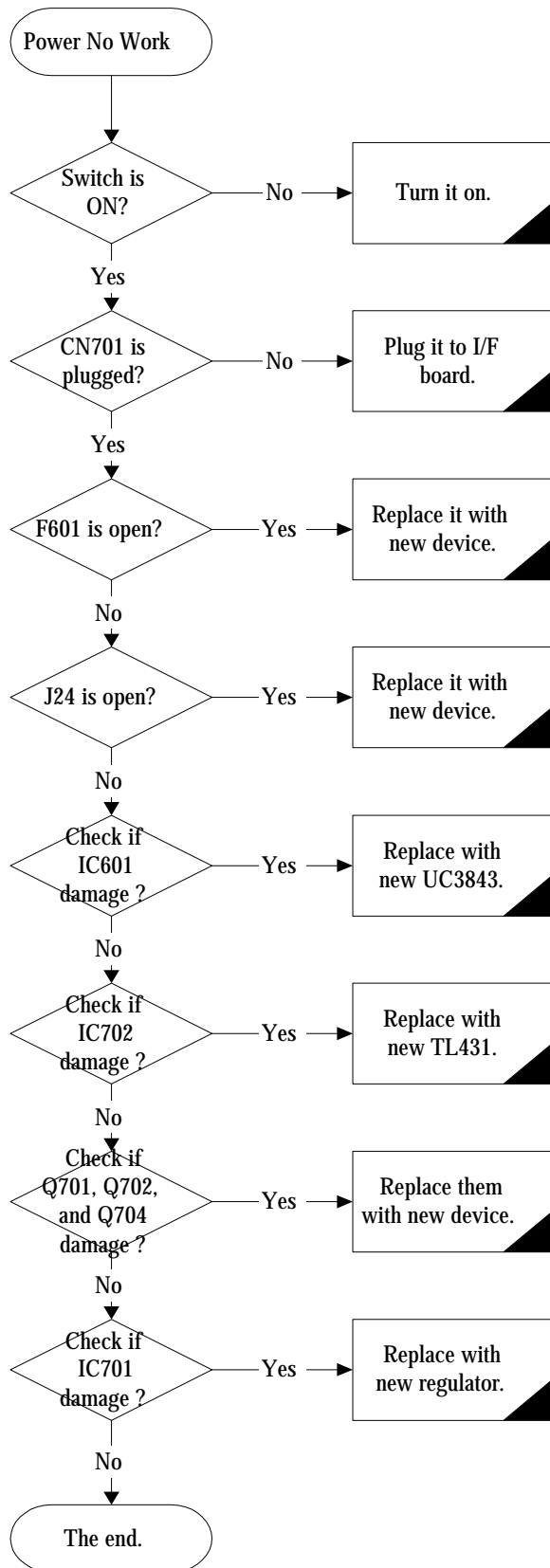
4.3.1 DDC



4.4 OSD function

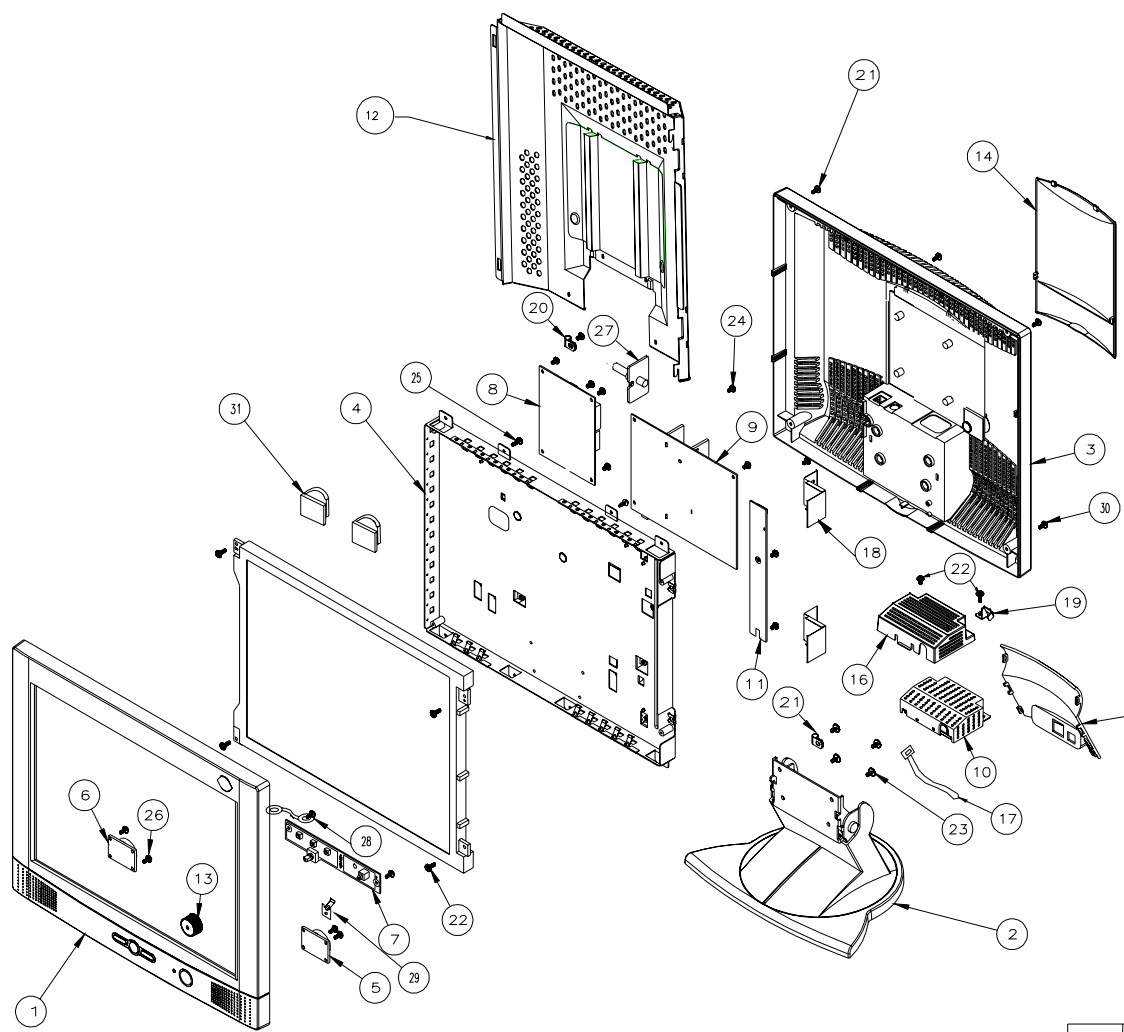


4.5 Power Board with audio



1 2 3 4 5 6 7 8 9 10 11

A
B
C
D
E
F
G



ITEM	PART NUMBER	DESCRIPTION	Q'TY
1	60.L0705.XXX	ASSY BEZEL	1
2	60.L0704.001	ASSY BASE	1
3	39.L0701.001	ASSY COVER REAR	1
4	60.L1601.001	ASSY BKT-R	1
5	65.LXXXX.001	ASSY SP+WIRE 370MM	1
6	65.LXXXX.001	ASSY SP+WIRE 200MM	1
7	55.L1402.001	CONTROL BD	1
8	55.L0703.001	INTERFACE BD	1
9	55.L1404.001	SPS BD	1
10	55.L1405.001	USB BD	1
11	54.05023.221	INVERT BD	1
12	60.L0706.001	ASSY SHD CVR	1
13	42.L1401.001	KNOB VR	1
14	42.L1403.001	CVR ACC	1
15	42.L1405.001	CVR BASE	1
16	42.L1407.001	CVR USB	1
17	38.05001.001	CABLE TIE YJ-98	1
18	31.L0702.001	SHD PANEL	2
19	31.L1301.001	CLIP BASE	1
20	34.74703.011	CLAMP CABLE	1
21	34.74803.001	CLIP CABLE	1
22	86.00110.140	SCREW M3X10	6
23	86.00010.161	SCREW TAPTILE M4X8	5
24	86.7A524.6R0	SCREW M3X6	19
25	86.WA314.8R0	SCREW M3X1.34P 8L	6
26	86.VG524.6R0	SCRW M3 TAP 6L	4
27	50.L1603.001	SIGNAL CABLE	1
28	50.JOXXX.001	CABLE	1
29	31.L0705.001	SPRING SPK	1
30	86.XA514.120	SCRW M3 FH TAP	4
31	42.L0703.001	CLIP FW-2	2
32			

A
B
C
D
E
F
G

UNIT OR ASSEMBLY		NAME	
DRN		ASSY DRAWING	
DSN		FINISH	
CKD			
APPD			

REV	DESCRIPTION	SIGN	DATE
SCALE	DM IN	M/M	
PARTS TOLERANCE(S)			
MOLD NO.			
SHEET			
1 OF 1			
DRAWING NO. 99.L1672.001			

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5. Spare Parts List

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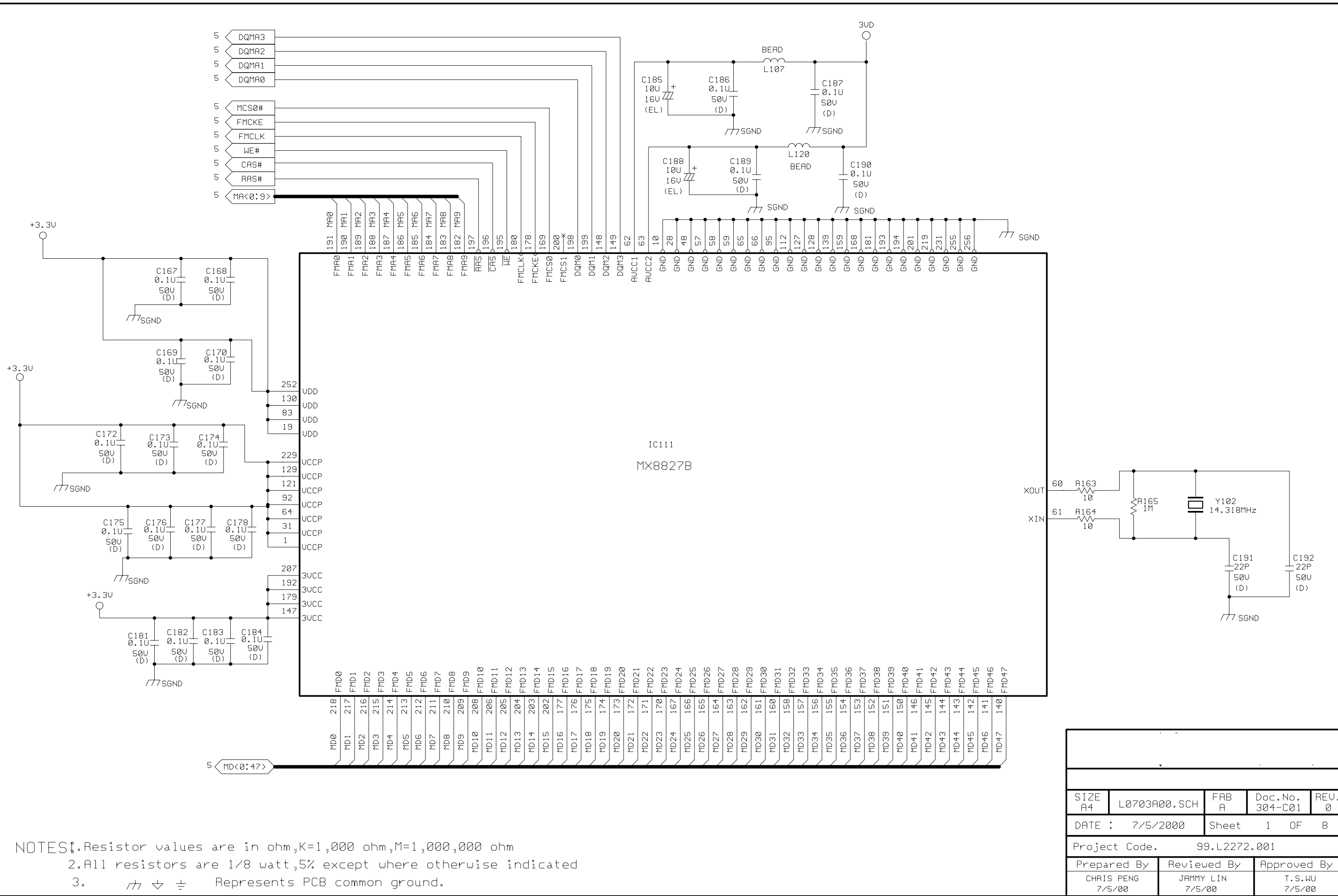
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1	55.L0704.001	SPS BD FP750(MI)	
2	04.07496.010	IC AMP TDA7496 SIP 15P	IC703
3	05.00123.010	IC OPTO PC123F1 DIP 4P	IC602
4	06.00100.052	SCR MCR100-6 400V 0.8A TO-92T	IC603
5	74.00431.A3B	IC V.R ZR431 SOT-23	IC702
6	74.03843.07K	IC PWM CTRL UC3843ADM SOIC 8P	IC601
7	04.3RF23.030	IC V.R PQ3RF23 3.3V TO-220	IC701
8	55.L2203.011	INTERFACE BD FP751 /MAX –MI	
9	74.03852.00B	IC OSD LSC3852DW SO-W 24P	
10	71.06383.00I	IC LVDS 24B THC63LVDM83A SSOP	IC116 IC117
11	71.09884.009	IC GRAPH DIGIT AD9884 MQFP128P	IC107
12	71.88282.A0E	IC FPD CTRL MX88L282 256P 3.3V	IC111
13	72.02421.001	IC EPROM 24LC21AT-SN SO-N 8P	IC101
14	72.24C04.A01	IC EEPORM 24C04 512K*8 SO-N 8P	IC102
15	72.45161.A09	IC DRAM 4516161AG5-A10-7JFTSOP	IC113 – IC115
16	73.07414.061	IC CMOS 74LVC14A SO-N 14P	IC108
17	74.01117.03M	IC V.R LD1117-3.3 0.8A TO-252	IC106 IC121 IC122
18	82.30006.001	XTAL 12MHZ 32P 30PPM	Y101
19	82.31431.001	XTAL 14.318MHZ 32P 30PPM 49US	Y102
20	84.04431.037	FET MOS SI4431DY-T1 PC SP-8	IC118
21	71.00112.M0C	IC MICON MTV112M PLCC44P/FP558	IC105
22	55.L2204.011	CTROL BD FP751/MAX-MI	
23	39.L0701.012	CVR REAR PC+ABS 002 FP750 T99	
24	50.L1603.001	SIGNAL/C 15/16P 2080MM 002	
25	54.05023.211	INVERTER BD FP730 AMBIT	
26	56.91L16.001	LCDM 17" L170E1/ADT	
27	60.L0704.012	ASSY BASE P042 751/MAXDA T99	
28	60.L0706.001	ASSY SHD CVR FP750/ACER	
29	60.L1601.001	ASSY BKT-R FP730	
30	60.L2201.001	ASSY BZL P042 751/MAXDATA T99	
31	65.L0701.001	ASSY SPEAKER+WIRE 370MM 8Ω 2W	
32	65.L0702.001	ASSY SPEAKER+WIRE 200MM 8Ω 2W	
33	42.L0811.001	PE-HD BAG 600*600*0.05T 24LNG	

Belinea 101710 LCD Monitor Service Guide

Spare Parts List

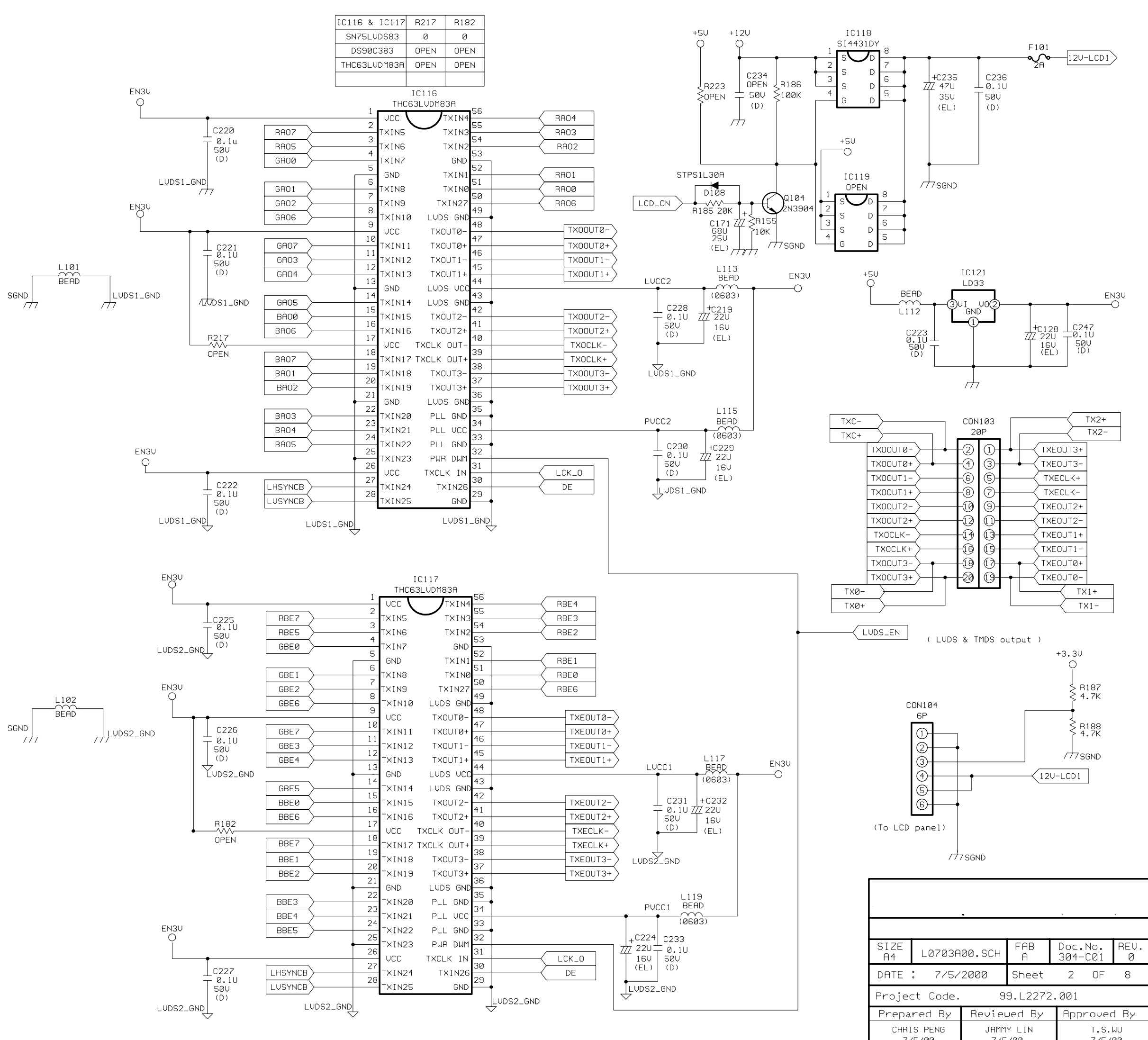
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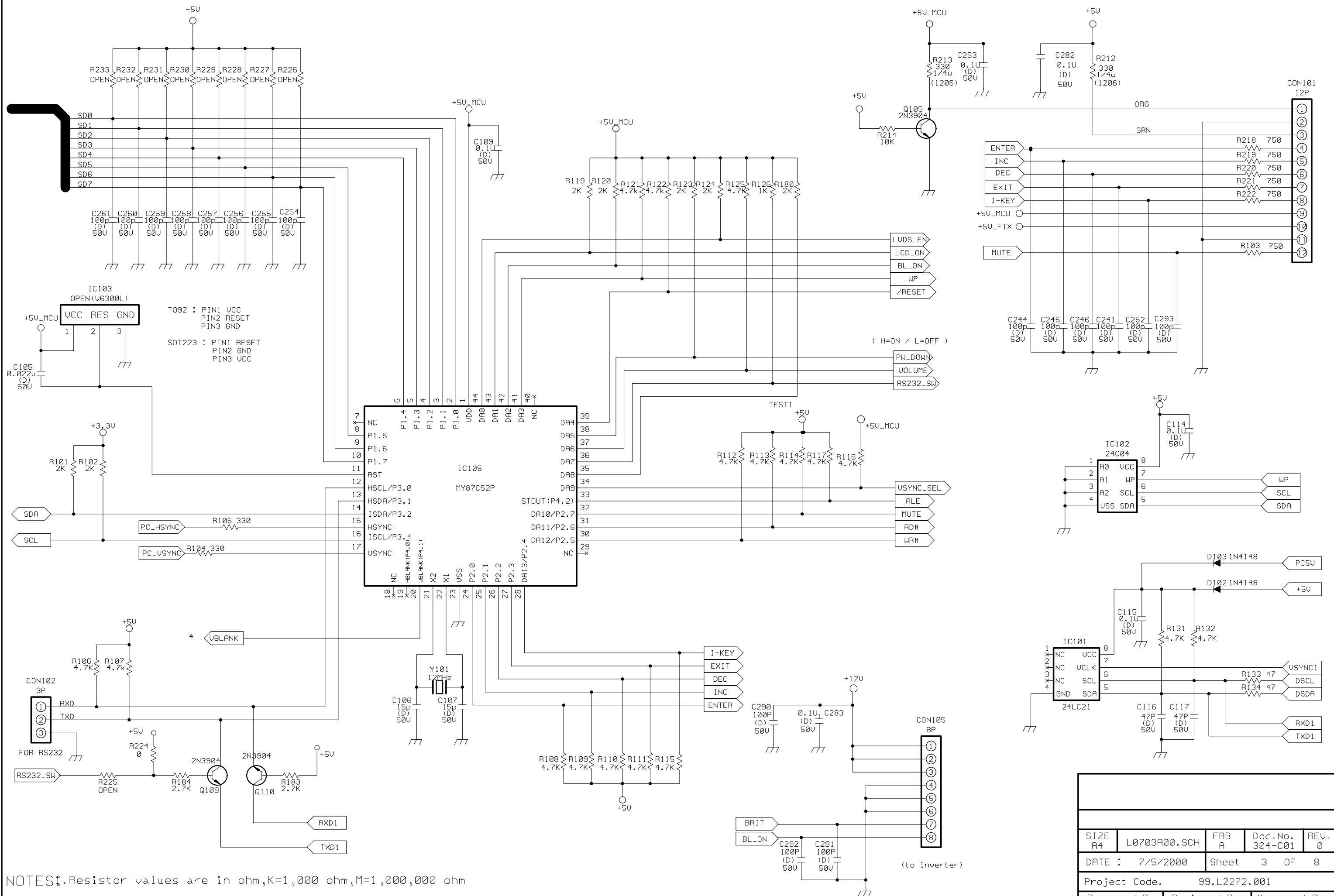
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35	44.70A01.091	CTN AB 570*338*621 751/MAXDATA	
36	44.70A02.001	CTN-CVR AB 1148*684 FP850	
37	47.L0701.001	CSN L EPS NATURE FP750	
38	47.L0702.001	CSN R EPS NATURE FP750	
39	49.L2201.022	MANUAL BELINEA 101710 T99 17L	
40	50.74405.501	CABLE AUD PC99PT284C/PT577C BK	



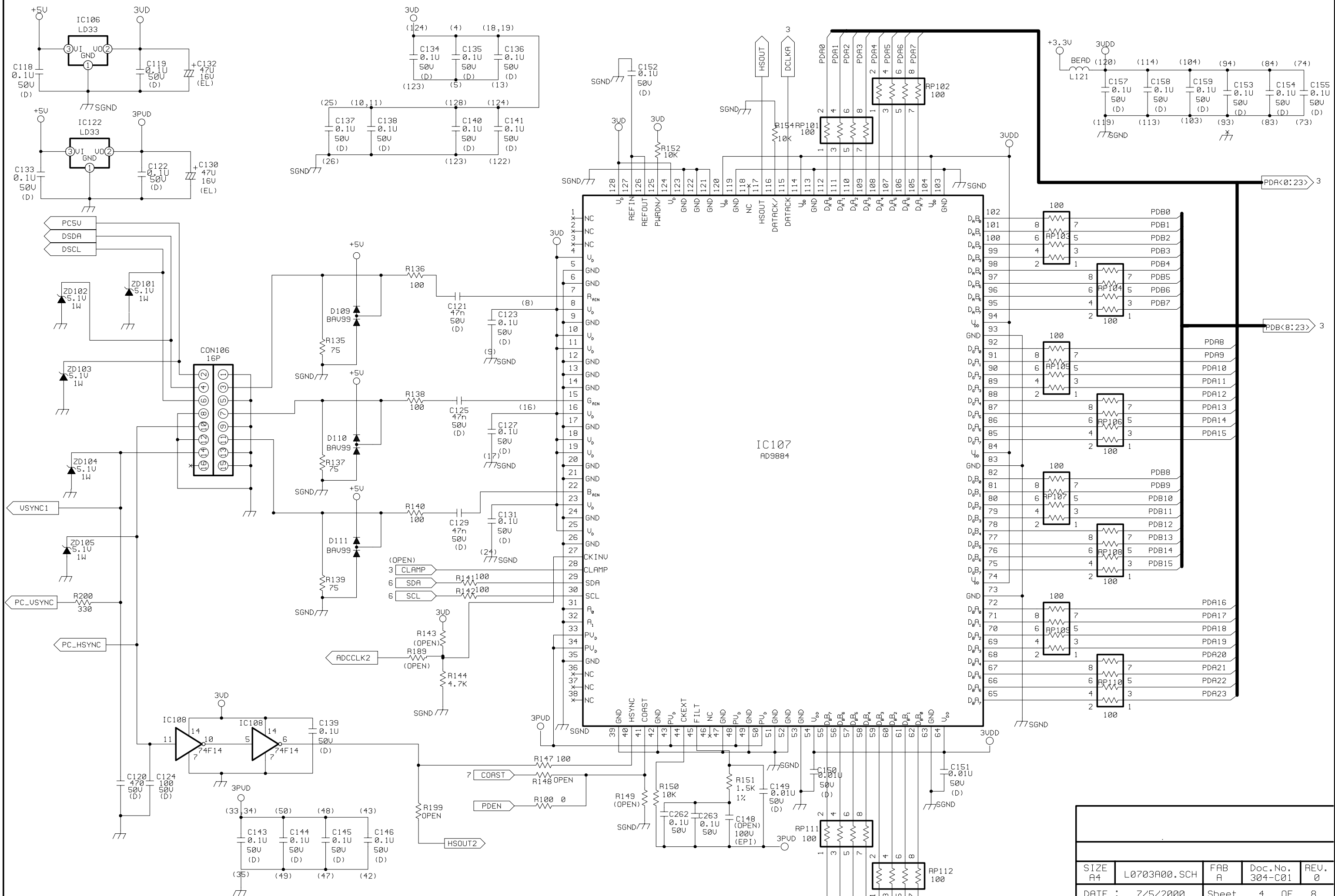
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2. All resistors are 1/8 watt, 5% except where otherwise indicated
3. Represents PCB common ground.

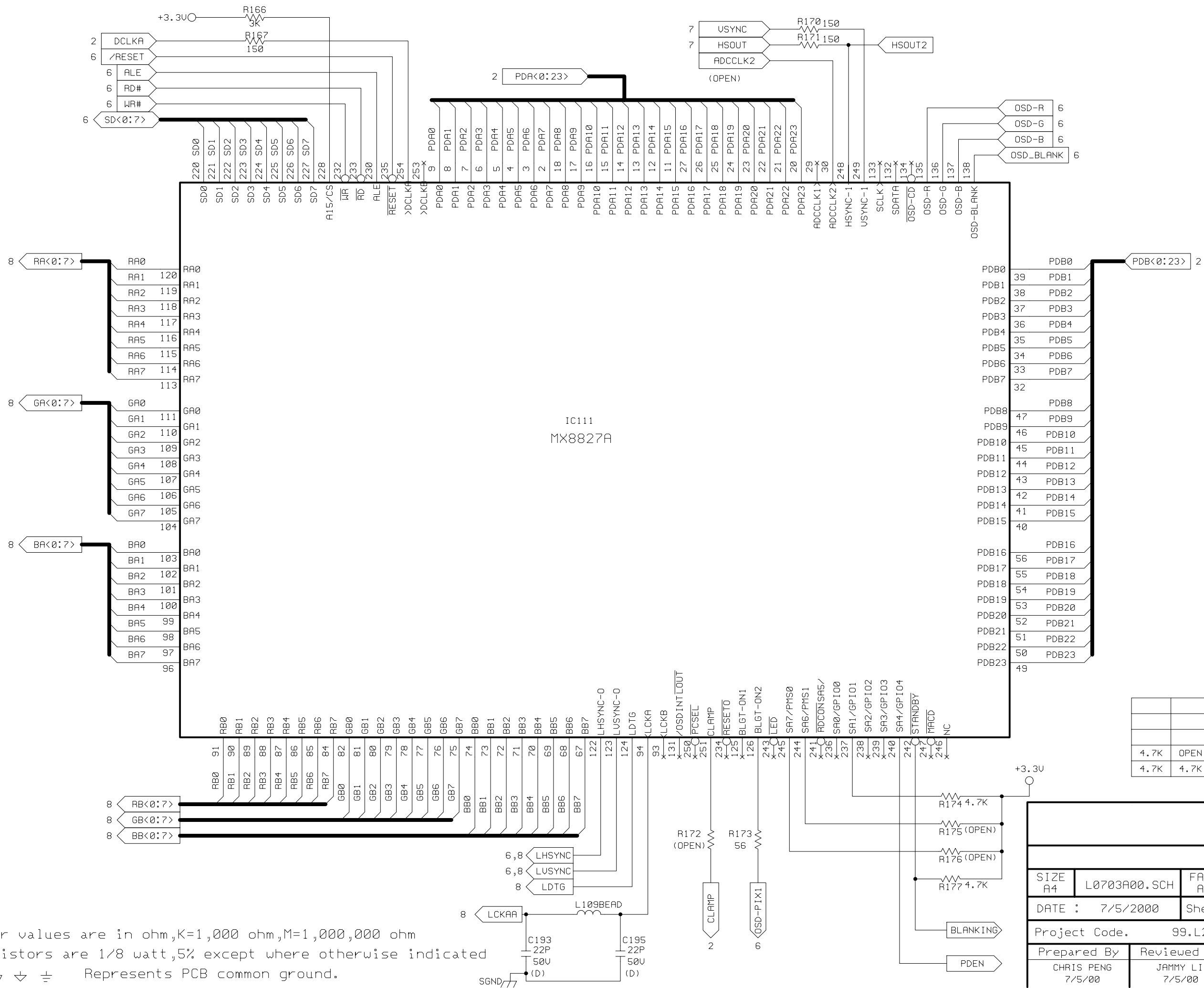
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Project Code. 99.L2272.001				
Prepared By CHRIS PENG 7/5/00		Reviewed By JAMMY LIN 7/5/00		Approved By T.S.WU 7/5/00





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Prepared By	Reviewed By	Approved By		
CHRIS PENG 7/5/00	JAMMY LIN 7/5/00	T.S.WU 7/5/00		

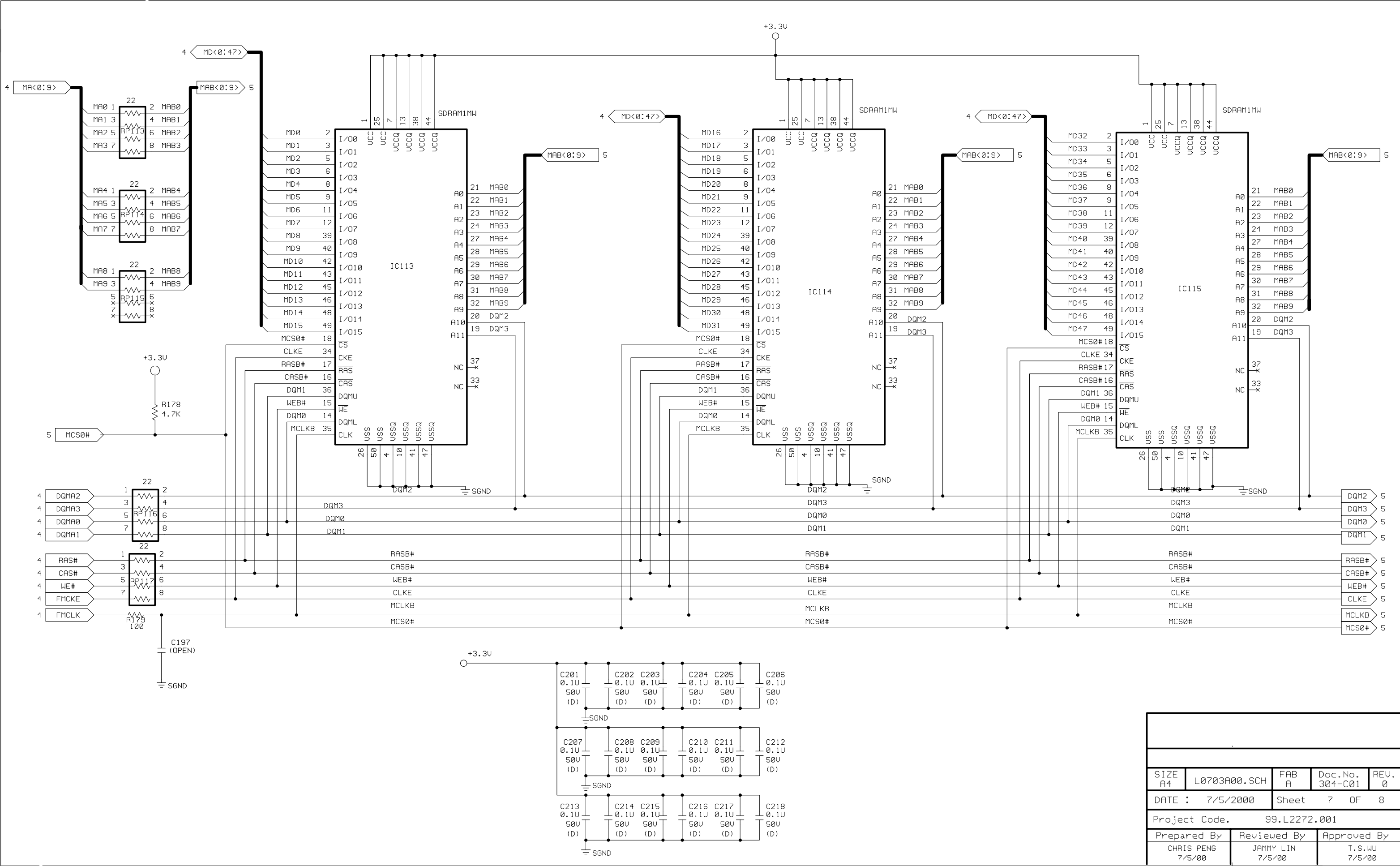




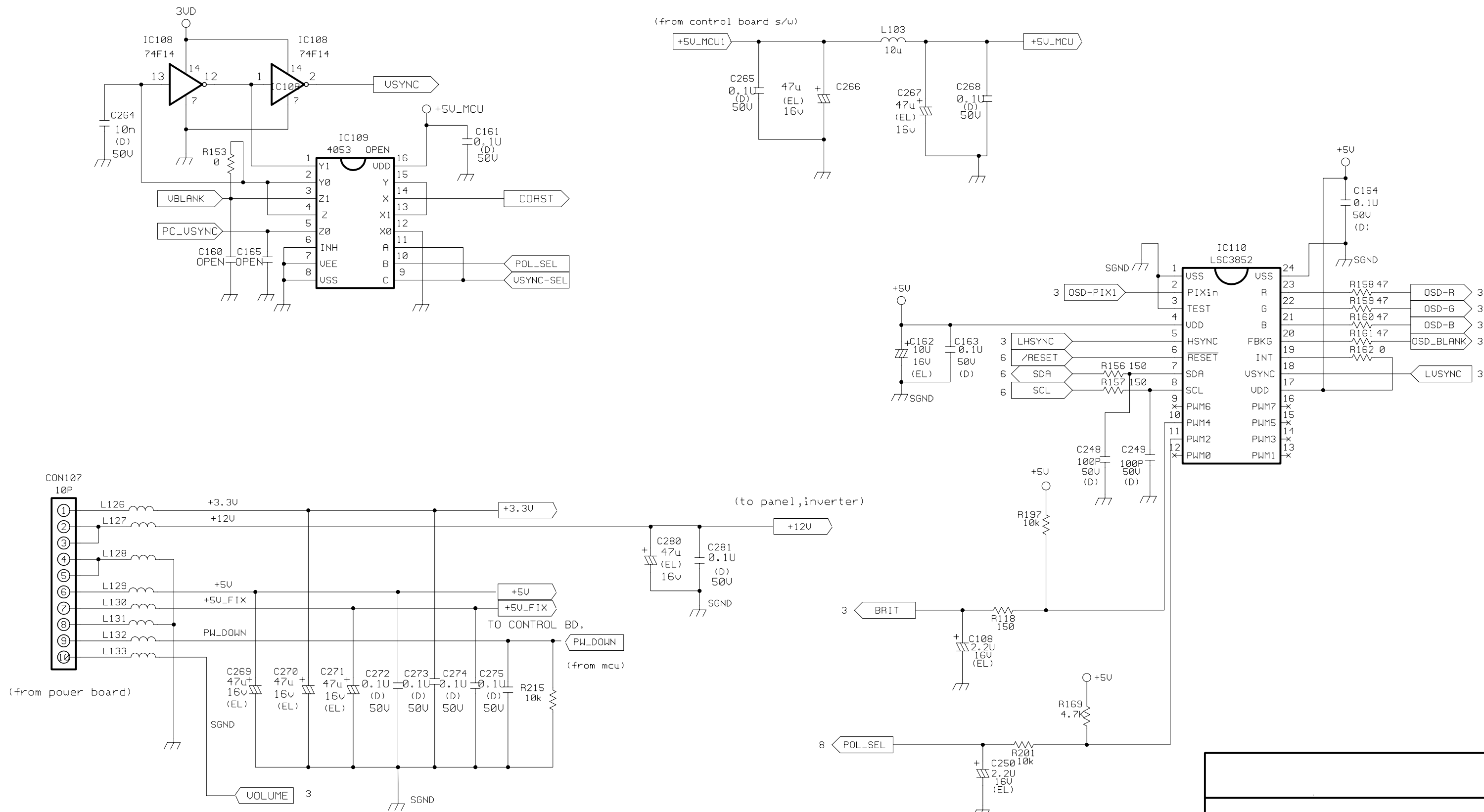
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2. All resistors are 1/8 watt, 5% except where otherwise indicated
3. ∇ ∇ ∇ Represents PCB common ground.

		FUNCTION
		Direct mode
		Reserved
4.7K	OPEN	Indirect mode
4.7K	4.7K	Serial Bus

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Prepared By CHRIS PENG 7/5/00		Reviewed By JAMMY LIN 7/5/00		Approved By T.S.WU 7/5/00



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DATE : 7/5/2000		Sheet 7	OF 8	
Prepared By CHRIS PENG 7/5/00		Reviewed By JAMMY LIN 7/5/00		Approved By T.S.WU 7/5/00



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